REMARKS

The Office Action of November 10, 2003 has been reviewed and the Examiner's comments carefully considered. Claims 12-27 are currently pending in this application. Claim 27 has been canceled. Claims 12 and 22 have been amended. Support for the language added to claims 12 and 22 can be found on page 1, lines 13-15. No new matter has been added. In view of these amendments and of the following remarks, Applicants believe that all the asserted rejections are in condition for withdrawal and all the claims are in condition for allowance.

Claim 27 stands objected to under 37 C.F.R. § 1.75(c) for failing to further limit the subject matter of a previous claim. Claim 27 has been canceled, thus this objection is moot.

Claims 12-17, 19, 21, 22 and 24-26 stand rejected under 36 U.S.C. 103(a) for purported unpatentability over Baron et al., U.S. 5,081,791 (hereinafter "Baron"); and claims 18, 23 and 27 stand rejected under 35 U.S.C. § 103(a) for purported unpatentability over Baron in view of Schnuda. The Examiner states that Baron discloses a plant substrate comprising mineral wool and an ion-exchange agent in a coherent matrix, but is silent about peat and of the agent being up to 20% volume with a capacity of at least about 15 meq/100g dry weight. The Examiner asserts that it would be obvious to discover these workable ranges using only routine skill in the art. The Examiner further asserts that it would be obvious to use peat as taught by Schnuda in the substrate of Baron in order to increase water retention in the substrate.

Applicants hereby submit a Declaration Under 37 C.F.R. § 1.132 (hereinafter "Declaration"). The Declaration is a statement by one knowledgeable in the field of the invention that the Baron disclosure, either alone or in combination with Schnuda, does not disclose or suggest a plant growth substrate of the same type as the plant growth substrate according to the present invention.

As stated in the Declaration, the new and nonobviousness features of the present invention inheres in a mineral wool plant growth substrate consisting of a coherent matrix of mineral wool fibers collected as a layer, in which the coherent matrix of mineral wool fibers are formed by adding a binder that is cured, so that the mineral wool fibers are fixed to one another at crossing points, thus resulting in a coherent matrix that is form-stable in relation to the uptake of water, i.e., the fibers are not displaceable relative to one another.

It is known that during growth of plants on typical mineral wool substrates, growers may adjust the growing conditions by adjusting the amount and/or the composition of the water (by adding nutrients, etc.) in which the plants are grown. Any change in the water-retaining capacity of the substrate, as well as in the nutrient dosing, will stress and possibly damage the growing plants. The Declarant states that the object of the present invention is to reduce such stress and possible damage to plants, which is provided by the buffering action of the ion exchange agent. However, if the water-retaining capacity of the coherent matrix would change, as what happens when a mineral wool substrate is not form stable, the buffering action of the ion exchange agent is interfered with and thus does not function as a buffering system. Additionally, because the present invention possesses this stable, form-retaining property which results from the wool fibers being fixed to one another at crossing points, the water-retaining capacity of the matrix, particularly during plant growth, is very controllable and predictable.

In contrast to the above, as attested to in the Declaration, Baron does not disclose a plant growth substrate that is the same type as the present invention because the Baron growth substrate does not comprise a form-stable, coherent matrix of mineral wool fibers that are fixed to one another by a cured binder, and thus are not displaceable relative to one another. Rather, the essential part of the Baron growth substrate is based on super absorbent particles that are uniformly distributed and not mutually fixed to one another but fixed instead to a holding sheet or to a lower surface of a plastic envelope. Upon wetting, the super absorbent particles may swell to 60 to 100 times their initial volume. Thus, the Baron plant growth substrate is not form-stable at all under wet growing conditions.

Furthermore, the Declarant states that it is incorrect to presume that the Baron growth substrate is a coherent matrix of mineral wool fibers and an ion exchange agent. Baron discloses the use of particles or fibers in relation to capillary water transport in between super absorbent particles in which the super absorbent particles is the central feature of the Baron substrate. As mentioned above, during growth the Baron growth substrate swells and thereby changes the water-retaining capacity of the plant growth substrate, which increases the stress on the plants. The swelling of the super absorbent particles to 60 to 100 times the initial volume would change or even disrupt a matrix of mineral wool fibers mutually fixed to one another by a cured binder, as provided in the present invention. It is for this reason that Baron uses super

absorbent particles and other particles or fibers that are all independently fixed to a loose-fitting supporting sheet and are not fixed to one another to form a coherent matrix. Thus, the Baron disclosure would not suggest to a skilled person to use capillary active particles or fibers in a growth substrate of super absorbent particles that are all fixed to one another. Furthermore, according to the Declarant the capillary action of the particles or fibers is introduced in order to improve water transport towards the super absorbent particles and not in the reverse direction, thus implying that the water-retaining capacity of the super absorbent particles is higher than the water-retaining capacity of the particles or fibers. Under these circumstances, the particles or fibers of Baron cannot function as an ion exchange agent, which function is to buffer a nutrient solution, thereby avoiding overdosing or underdosing of water and nutrients by a grower. Indeed, for an ion exchange agent to function as a buffer, it requires the presence of free water. Free water, however, is absent in the plant growth substrate disclosed by Baron. This is because all free water is stored in the swelling of the super absorbent particles.

Based on the above, Applicants submit that the additional teachings of Schnuda cannot make up for the failure of Baron to teach or suggest the use of a coherent matrix of mineral wool fibers fixed mutually together at crossing points by a cured binder which is formed stable to provide an ion exchange agent of a particular ion exchange capacity and volume in order to function as a buffering agent during plant growth so as to avoid stress or damage resulting from overdosing or underdosing of aqueous nutrient solutions. Therefore, claims 12-26 define over Baron, alone or in combination with Schnuda.

Applicants respectfully submit that amended claims 12 and 22 are proper for entry after a final office action because the added language contained therein recites the same invention which was previously searched, but now is more particularly claimed.

Based on the foregoing, Applicants respectfully submit that claims 12-26 now are patentable and in condition for allowance. Reconsideration of the rejections and allowance of claims 12-26 are respectfully requested.

Respectfully submitted,

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.	:	09/762,778
Applicants	:	Anton Blaakmeer et al.
Filed	:	April 20, 2001
Title	:	"MINERAL WOOL PLANT SUBSTRATE"
Group Art Unit	:	3643
Examiner	:	Son T. Nguyen

Commissioner of Patents
Alexandria, Virginia 22313

DECLARATION UNDER 37 C.F.R. § 1.132

I, Anton Blaakmeer, declare as follows:

1. I am the first-mentioned inventor of the invention described and claimed in the above-identified application.

2. I am a citizen of The Netherlands, and reside at the Wijnruit 46 in Venray. I graduated from Agriculture University Wageningen on the 28th of March 1989. I hold a Ph.D. in agricultural and environmental science. Since 1998, I have been employed at Rockwool International A/S and have been responsible for research and development of new fibres and binders for mineral wool plant growth substrates.

3. I have read and am thoroughly familiar with the contents of the above-identified patent application as well as of the prior art references cited in the application. I have studied the Office Action dated November 10, 2003, and the relevant cited documents.

4. The present patent application relates to a mineral wool plant growth substrate. Such plant growth substrate consists of a coherent matrix of mineral wool fibres. As explained in the application (page 1, lines 9-17), these mineral wool fibres after their formation are collected as a layer. The fibres are provided with a binder which is cured such that the mineral wool fibres are fixed to one another at crossing

points. Thereby is formed a coherent matrix of mineral wool fibres which is form stable in relation to the uptake of water. In the manufacturing process of such plant growth substrate the properties of the mineral wool matrix may be adjusted by the used binder system (see WO 9707664), by the addition of a wetting agent in order to increase the rate of water uptake, or by additives (WO 9300797 and WO 9716961). However, due to the form retaining property, the ultimate water retaining capacity of such matrix particularly during growth is very well controllable and predictable. If such mineral wool substrate would not be form stable in relation to their water content, these properties are insufficiently controllable and predictable, and the objectives of the invention would not have been met.

5. During growth of plants on such mineral wool substrate, the grower may adjust the growing conditions by adjusting the amount and/or the composition of the water in which the plants grow (by the addition of nutrients and the like). A change in water retaining capacity and nutrient dosing inadvertently stress and possibly damage the growing plants.

6. The present invention has for its object to reduce such stress and possible damage to plants. The present invention requires the addition of an ion exchange agent (of particular ion exchange capacity and volume) which will provide buffering properties and thereby reduce stress and damage. If during their buffering action during plant growth thereon the water retaining capacity of the coherent matrix would change because the mineral wool substrate is not form stable, this would interfere with the function of the ion exchange agent added according to the present invention.

7. The present invention has been asserted to be obvious in view of Baron (US Patent No. 5,081,791). However, Baron does not relate to a plant growth substrate of the same type as the plant growth substrate according to the present invention. The Baron growth substrate does not comprise a coherent matrix of mineral wool fibres connected to one another by a cured binder. The Baron plant growth substrate is based on super absorbent particles uniformly distributed and fixed to a holding sheet or a lower

surface of a plastic envelope. Upon wetting, these super absorbing particles may swell to 60 to 100 times greater volumes. Thus, the Baron plant growth substrate is not form stable under all growing conditions.

8. Baron discloses the addition of particles or fibres in order to improve the capillary water transport between the super absorbent particles. As particles are exemplified clay, bentonite and zeolite. As fibres are exemplified natural fibres such as cellulose or synthetic fibres such as textile fibres and mineral fibres.

9. It is not correct to presume that the Baron growth substrate is a coherent matrix of mineral wool fibres and of an ion exchange agent. First, Baron discloses the use of particles or fibres in relation to capillary water transport in between super absorbent particles. Second, these super absorbent particles form the essential part of the Baron substrate. During growth, the Baron growth substrate swells and thereby changes the water retaining capacity and stress on the plants is increased. Furthermore, the swelling of the super absorbent particles (to 60 to 100 times the initial volume) would change or even disrupt the matrix of mineral wool fibres mutually fixed to one another by a cured binder. This is the reason why Baron uses super absorbent particles and other particles or fibres all independently fixed to a loose fitting supporting sheet and not fixed to one another for forming a coherent matrix.

10. Thus, the Baron patent would not suggest to the skilled person the use of capillary active particles or fibres in such a growth substrate of super absorbent particles fixed to one another. I note that the capillary action of the particles or fibres is introduced in order to improve the water transport towards the super absorbent particles (and not in the reverse direction). This implies that the water retaining capacity of the super absorbent particles is higher than the water retaining capacity of the particles or fibres. Under such circumstances, these particles or fibres cannot function as an ion exchange agent which functions as a buffer for the nutrient solution thereby avoiding overdosing or underdosing of any addition by the grower.

11. For the buffering function, the ion exchange agent requires the presence of free water. However, such free water is absent in the plant growth substrate according to Baron. All free water is stored in the swelling super absorbent particles.

12. In relation to the addition of clay in the present invention (claim 19), I note that clay has a variable ion exchange capacity depending on its water content. Thus, the presence of both a constant and variable ion exchange agent provides an improved plant growth substrate with improved growth properties.

13. I conclude that the Baron patent does not disclose or suggest a plant growth substrate consisting of a coherent matrix of mineral wool fibres fixed mutually together by a cured binder and comprising an ion exchange agent of particular ion exchange capacity and of volume in order to function as a buffering agent during plant growth in order to avoid stress or damage due to overdosing or underdosing of any additions of the nutrient solution.

14. I declare further that all statements made herein of my own knowledge are true and that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application and any patent issuing thereon.

Anton Blaakmeer

Date 19-7-2004

Curriculum vitae

PERSONALITY

Family name	:	Blaakmeer
First name	:	Anton
Gender	:	Male
Nationality	:	Dutch
Adress	:	Wijnruit 46
Postal code + home	:	5803 LE VENRAY
Telephone	:	0031 478568664
Date of birth	:	1964-10-11
Place of birth	:	Slootdorp
Civil state	:	Living together
Hobby	:	Cycling, tinker/mechanics, gardening, motor-cylcing

EDUCATION

1977 - 1984	:	Secondary modern school: Dutch, English, Chmistry, mathematics I and II, Physics and Biology
1984 - 1989	:	Agriculture University Wageningen: Molecular Science (chemical orientation)

COURSE

- Radiation Expert, level 5B (how to work with radioactive materials and sources)
- English for PHD students
- Modern Separation techniques (ANAC module)
- Polymer Chemistry (Post Academic Schooling)
- Projectmanagement I and II (Rockwool University)
- Rockwool Management as a Profession (Rockwool University)
- Masterclass Knowledge Management (De Baak)
- I and the Others (De Baak)
- Surfactans and Polymers in Aqueous solution (YKI-Sweden)
- Young Executive Program (De Baak; starts in January 2004)

CAREER

April '89 - July '89:		Temporary employeed as an analytical chemist for a quality controlling company (Conex in Ede)
Sept. '89 - December '93:		PHD student at the depart of Organic Chemistry (Agriculature University Wageningen); graduated at 1994-6-21
March '94 - January '95:		National service: orderly (rank: corporal)
May'95 - January '98	:	Employeed as scientist at a research station (AB-DLO in Wageningen)
Februari '98 -present	:	Projectmanager at the R&D department of Grodan BV

Subjects of final examination at the university:

1. Development of a high performance liquid chromatography (HPLC) method for the determination of limonin (a compound with a bitter taste) in grapefruit juice and other citrus juices.
2. Identification of the biosynthesis pathway of thiophenes in cell suspensions of *Tagetes patula* by using radioactive sulphate in time-course and pulse-chase experiments.

Subjects at the quality controlling company:

Development of different methods, both GC and HPLC, for the determination of (1) germination inhibitors used for the storage of potatos, (2) aflatoxines in milk, nuts and cattle-fodder, (3) Avermectin (insecticide used in cucumber cultivation) and (4) vitamin C in frozen vegetables.

PHD study

The PHD study was part of ongoing research on insect/plant relationships and tritrophic systems which took place at the Department of Entomoly and Organic Chemistry. The aim of the study was to isolate (HPLC) and identify (MS, GC-MS, UV, IR, H and C^{13} NMR) infochemicals which were involved in *Cotesia-Pieris*-Crucifer relationships with the prospect of their eventual use in cabbage crop protection. The study focussed on two topics: regulation of (1) *Pieris* host selection and oviposition behaviour and (2) host selection behaviour of parasitoids of *Pieris* larvae.

Research station AB-DLO

At the department of Plant Physiology of AB-DLO (agrobiology and soil fertilisation research station), I have synthesized different slow release plant hormones for different applications. A slow release AOA derivative was synthesized for prolonging the vase life of cut flowers. This specific anti-ethylene compound was in most cases as effective as STS (silver-thio-sulphate). The use of STS was restricted due to environmental reasons. Another slow release hormone which was quite active was indolehexanoic acid. This compound induces the rooting of cuttings. After uptake by the wound meristem, decarboxylation takes place which results in the active plant hormone (IBA). Beside the synthesis, I was also involved in the development of graft promoters.

Grodan R&D

After a introduction period, I initiated, based on the available reports, the change over from the old F to the HT fibre. At the same time, I also initiated the Phoenix project (production of stonewool substrates with a hydrophyllic binder system based on a renewable raw material). This project is still on going and there are some items left that have to be solved (together with RI and the supllier) like the stickyness of the binder in the winter season.

I have been projectleader of the project Blackbird. The purpose of this project was to replace the wetting agent at that time for a more environmental friendly one. I have also been projectleader for two different projects funded by Senter and Novem. TNO and PPO were particpating in both projects. The aim of the projects was to optimize our stonewool substrate and to deliver a proof of principle (POP) for the necessity of oxygen in the root environment of plants. During the last

two years, together with Gertus de Sauvage (a former Grodan employee), we developed a new cultivating system based on the old active drain system (ADS). This project is now put on hold due to its major impact (negative) that it can have for the sales of Grodan substrates.
After the junction of the R&D departement and Substratus in 2001, I was also responsible for the development of a Virtual Knowledge Center (VKC). The background was that the availability of know how within the whole organisation had to be improved. The system is running from August 2003 but due to organisation changes with Grodan somebody from the Substratus organisation will take it over.

Publications:

T.A. van Beek and A. Blaakmeer (1989). Determination of limonin in grapefruit juice and other citrus juices by high performance liquid chromatography. *J. Chromatogr.* 464: 375-386.

H. Helsper and A. Blaakmeer (1989). Biosynthesis of thiophenes in cell cultures of *Tagetes patula*. *Suppl. Plant Physiol.* 4: 10.

J.J.A. van Loon, A. Blaakmeer, F.C. Griepink, T.A. van Beek, L.M. Schoonhoven and Ae. de Groot (1992). Leaf surface compound from *Brassica oleracea* (Cruciferae) induces oviposition by *Pieris brassicae* (Lepidoptera: Pieridae). *Chemoecology* 3: 39-44.

T.A. van Beek, A. Blaakmeer, F.C. Griepink, J.A.A. van Loon, J.H. Visser and Ae. de Groot (1994). Chemical Ecology as a lead for the Development of Environmentally Safe Insect Control Agents, pp 52-69 *in* G.G. Briggs (ed.). Proc. 3rd Int. Symo. Advances in the Chemistry of Insect Control III. Royal Society of Chemistry, Cambridge.

A. Blaakmeer, A. Stork, A. van Veldhuizen, T.A. van Beek, Ae. de Groot, J.J.A. van Loon and L.M. Schoonhoven (1994). Isolation, identification and synthesis of miriamides, new hostmarkers from eggs of *Pieris brassicae*. *J. Nat. Prod.* 57: 90-99.

A. Blaakmeer, J.B.F. Geervliet, M.A. Posthumus, J.J.A. van Loon, T.A. van Beek, and Ae. de Groot (1994). Comparative headspace analysis of cabbage plants damaged by two species of *Pieris* caterpillars: Consequences for in-flight host locationn by *Cotesia* parasitoids. *Entomol. Exp. Appl.* 73: 175-182.

A. Blaakmeer, D. Hagenbeek, T.A. van Beek, Ae. de Groot, J.J.A. van Loon and L.M. Schoonhoven (1994). Plant response to eggs *vs.* host marking pheromone as factors inhibiting oviposition by *Pieris brassicae*. *J. Chem. Ecol.* 20: 1657-1665.

A. Blaakmeer, D. van der Wal, A. Stork, T.A. van Beek, Ae. de Groot and J.J.A. van Loon and L.M. Schoonhoven (1994). Structure-activity relationship of isolated avenanthramide alkaloids and synthesized related compounds as oviposition deterrents for *Pieris brassicae* (Lepidoptera: Pieridae). *J. Nat. Prod.* 57: 1145-1151.

W.M. van der Krieken, J. Kodde, M. Visser, D. Tsardakas, A. Blaakmeer, K. de Groot and L. Leegstra (1997). Increased induction of adventitious rooting via slow release auxins and elicitors *in* Altman (ed.). Biology of adventious rooting. Plenum press, New York.

Patents:

A. Blaakmeer, T.A. van Beek, Ae. de Groot, J.J.A. van Loon and L.M. Schoonhoven (LU Wageningen), nieuwe N-acyl-antranilzuurverbindingen en toepassingen van N-acyl-antranilzuurverbindingen bij de bestrijding van insecten.
Patent submission O.A.92.02078Ned.(30-11-1992).

A. Blaakmeer and P.J.L.H. Bouwens. Zebra; PCT/EP99/05759

A. Blaakmeer. Blackbird; PCT/EP01/0495.

A. Blaakmeer and D. Kuiper. Oxygen; PCT/EP02/07781.

A. Blaakmeer and G. de Sauvage: Octopus; PCT/EP02/07741

A. Blaakmeer and G. de Sauvage. Octopus II; filed January 03